20040226.021102

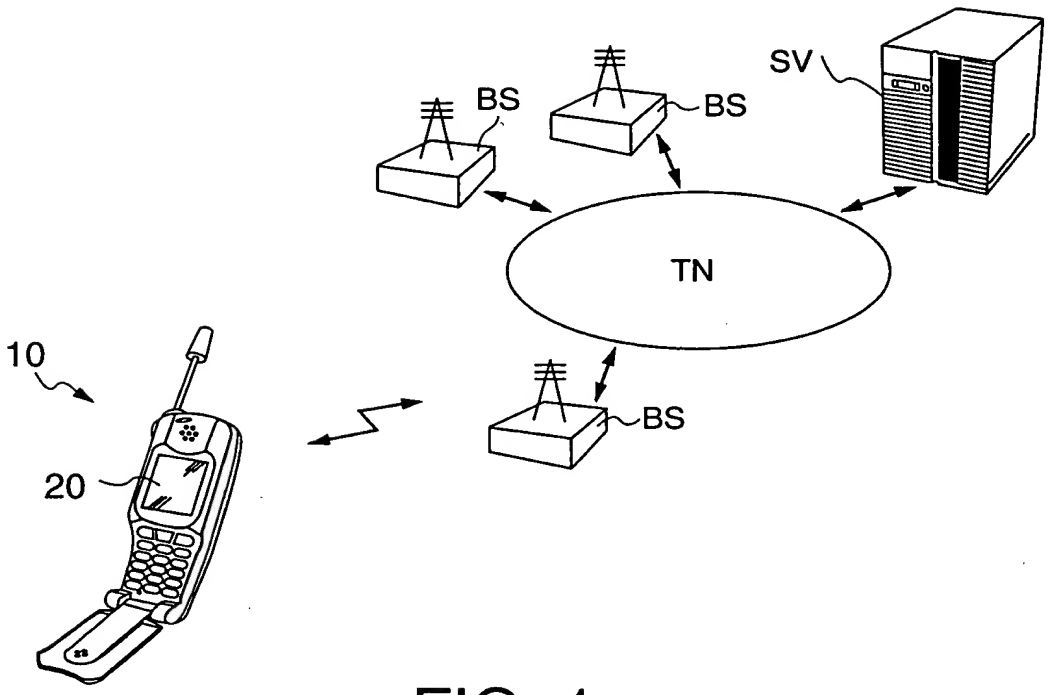


FIG. 1

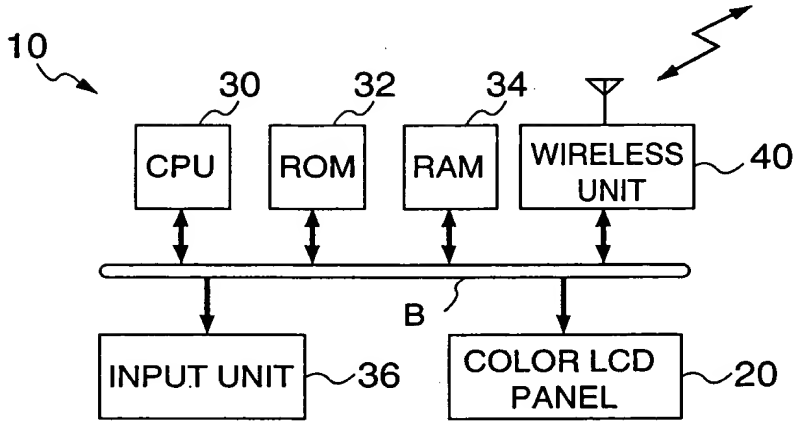


FIG. 2

09656267.021102

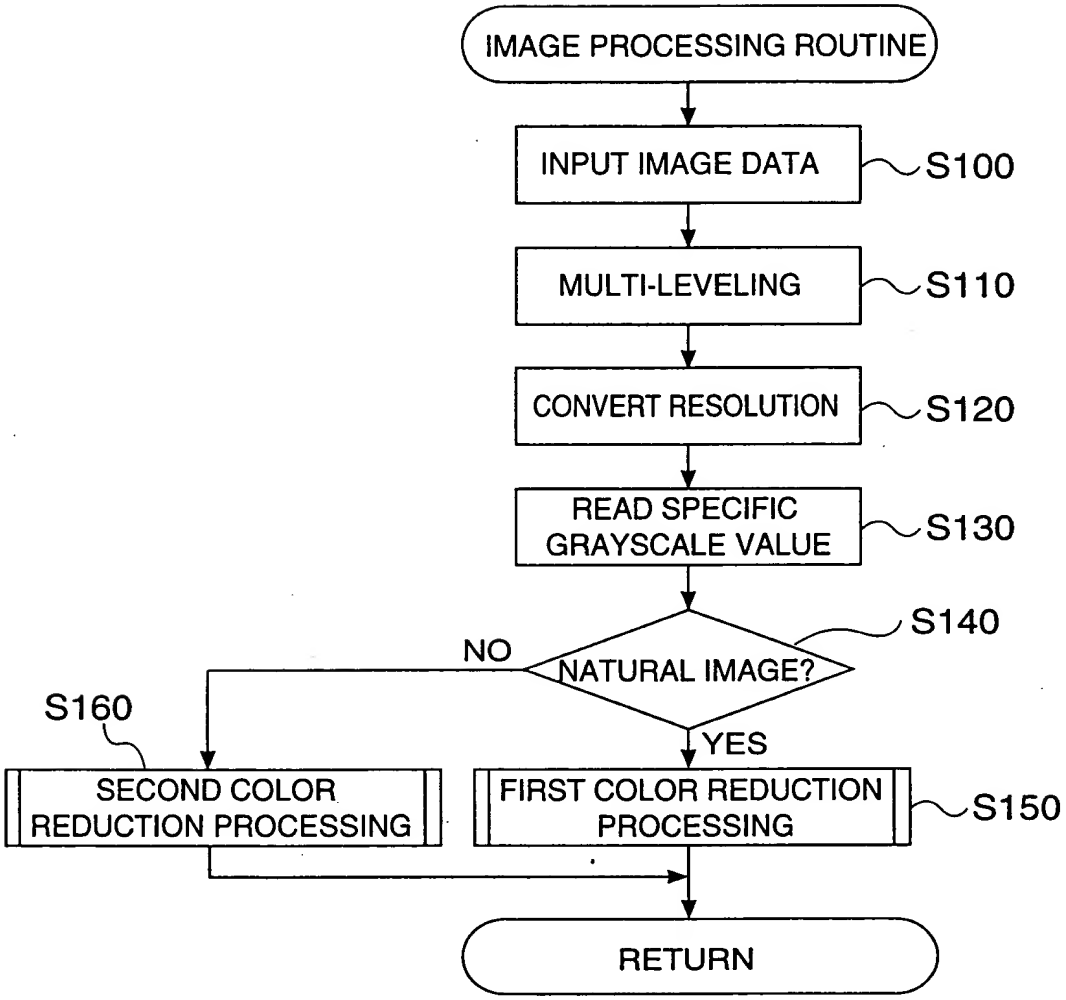


FIG. 3

PALETTE INDEX COLOR	(R , G , B)
0	(255 , 255 , 255)
1	(232, 100 , 140)
2	(221 , 255 , 30)
3	(180 , 75 , 0)
⋮	⋮
252	(0 , 97 , 156)
253	(0 , 30 , 170)
254	(0 , 0 , 85)
255	(0 , 0 , 0)

FIG. 4

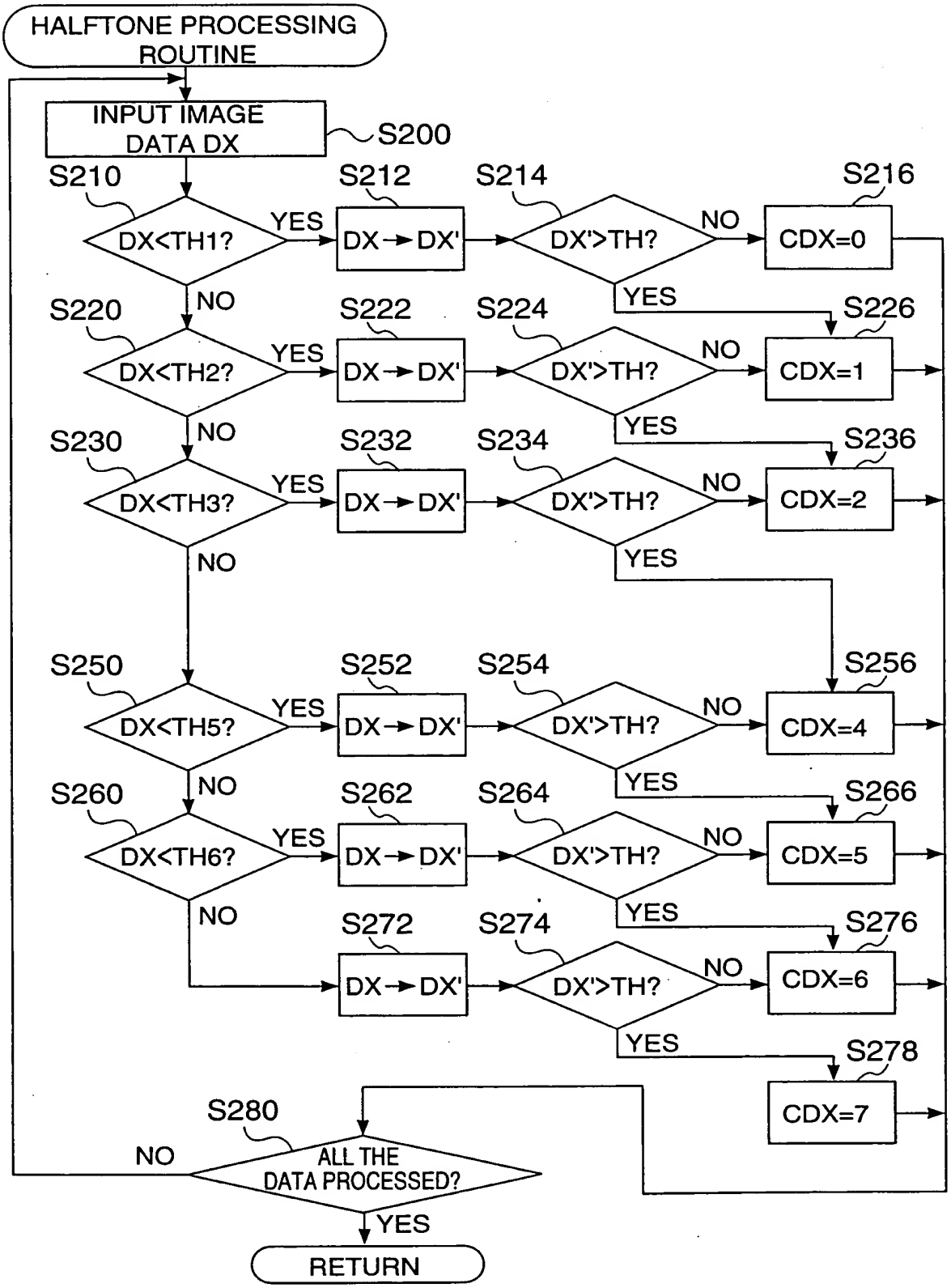

HALFTONE PROCESSING ROUTINE
INPUT IMAGE DATA DX
S200
S210
DX<TH1?
YES
S212
DX→DX'
S214
DX'>TH?
NO
S216
CDX=0
NO
YES
S220
DX<TH2?
YES
S222
DX→DX'
S224
DX'>TH?
NO
S226
CDX=1
NO
YES
S230
DX<TH3?
YES
S232
DX→DX'
S234
DX'>TH?
NO
S236
CDX=2
NO
YES
S250
DX<TH5?
YES
S252
DX→DX'
S254
DX'>TH?
NO
S256
CDX=4
NO
YES
S260
DX<TH6?
YES
S262
DX→DX'
S264
DX'>TH?
NO
S266
CDX=5
NO
YES
S272
DX→DX'
S274
DX'>TH?
NO
S276
CDX=6
YES
S278
CDX=7
S280
ALL THE DATA PROCESSED?
NO
YES
RETURN

FIG. 5

20120229960

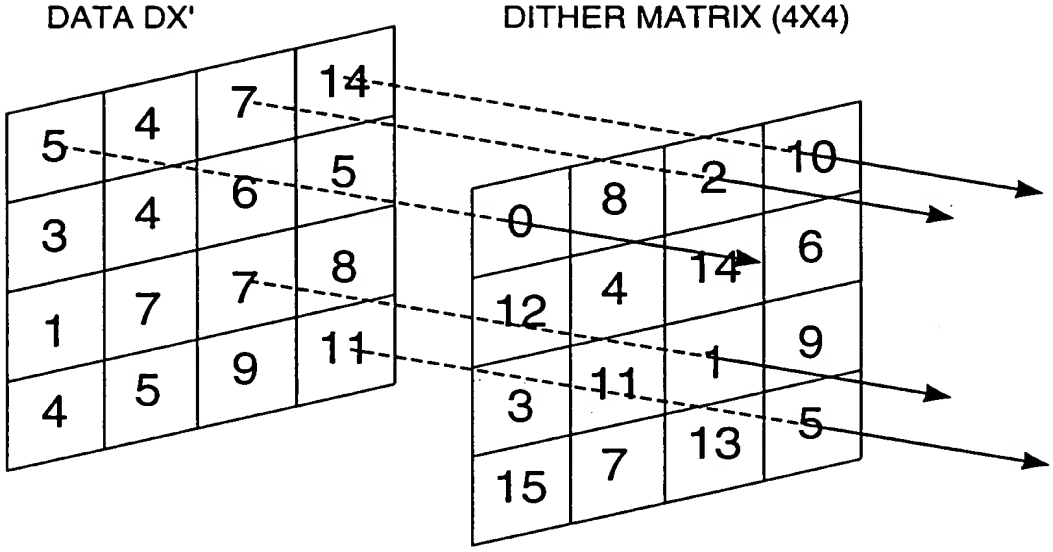


FIG. 6

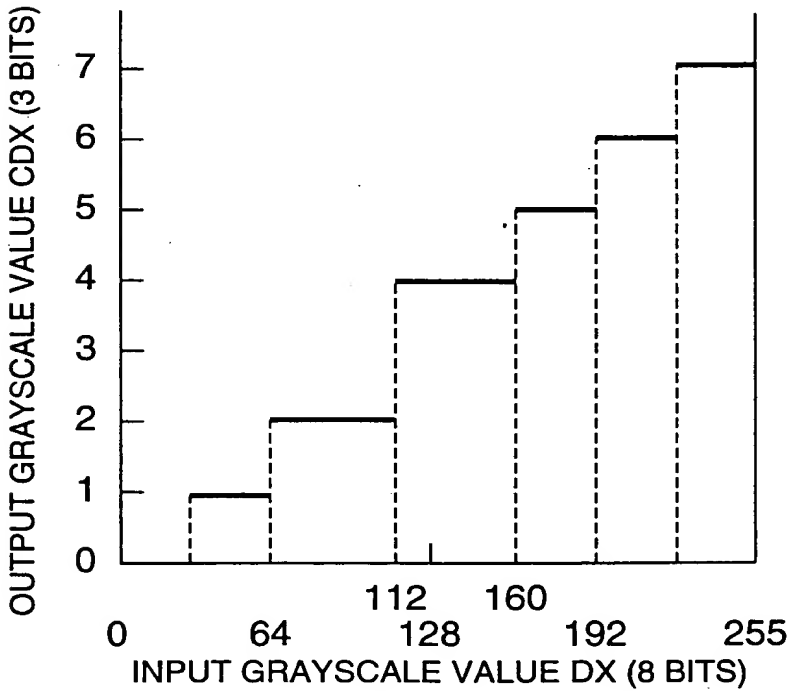


FIG. 7

09862607-022402

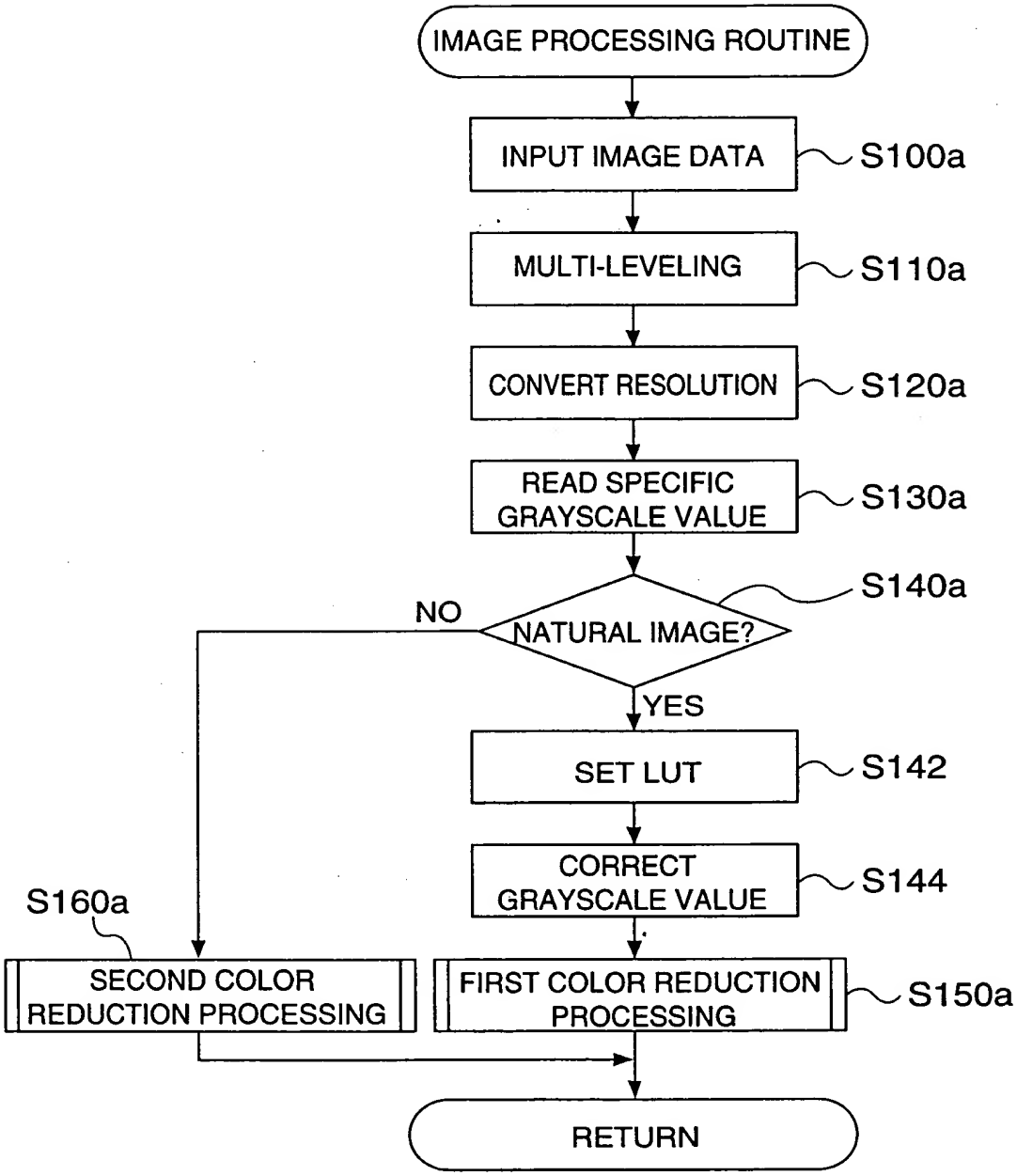


FIG. 8

R LUT

DXR	DXr
0	0
• • •	• • •
104	96
• • •	• • •
120	128
• • • • •	• • • • •
255	255

FIG. 9

0602702

20040227.025102

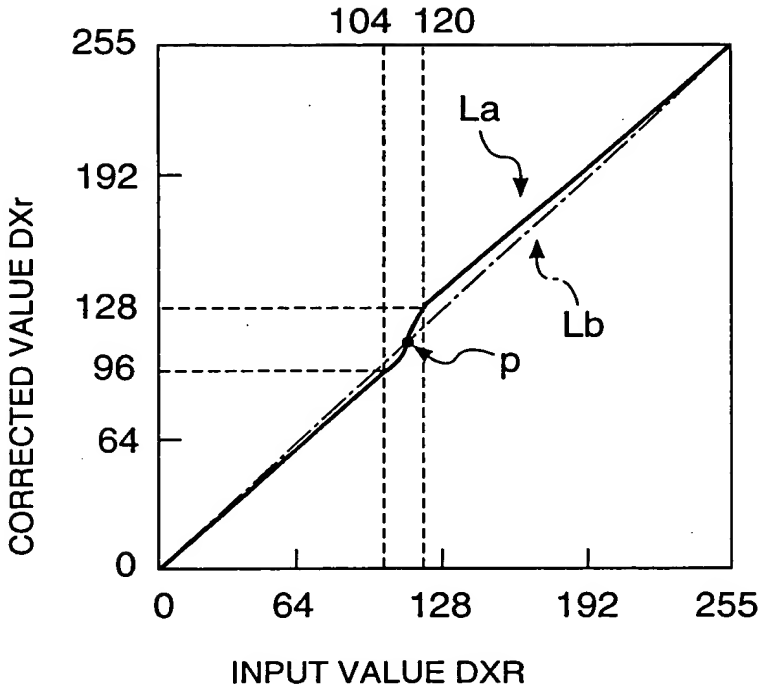


FIG. 10

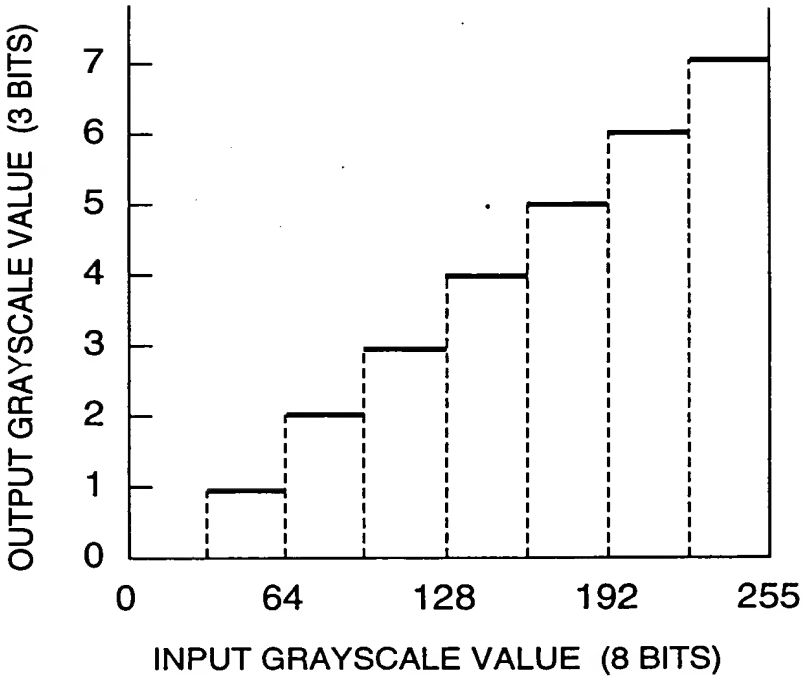


FIG. 11

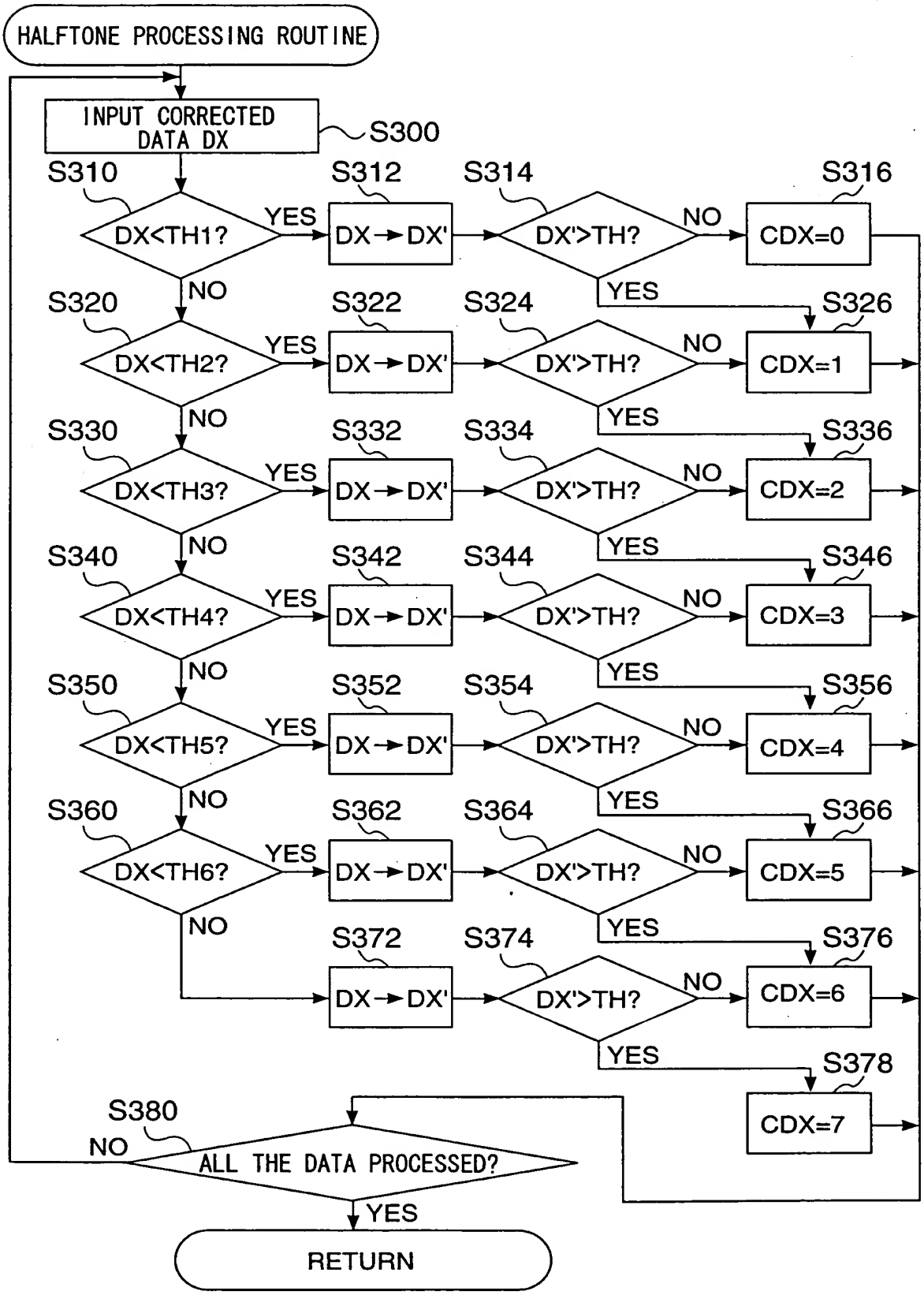


FIG. 12

JP2004-056596A 2004.02.19

0056267.02400

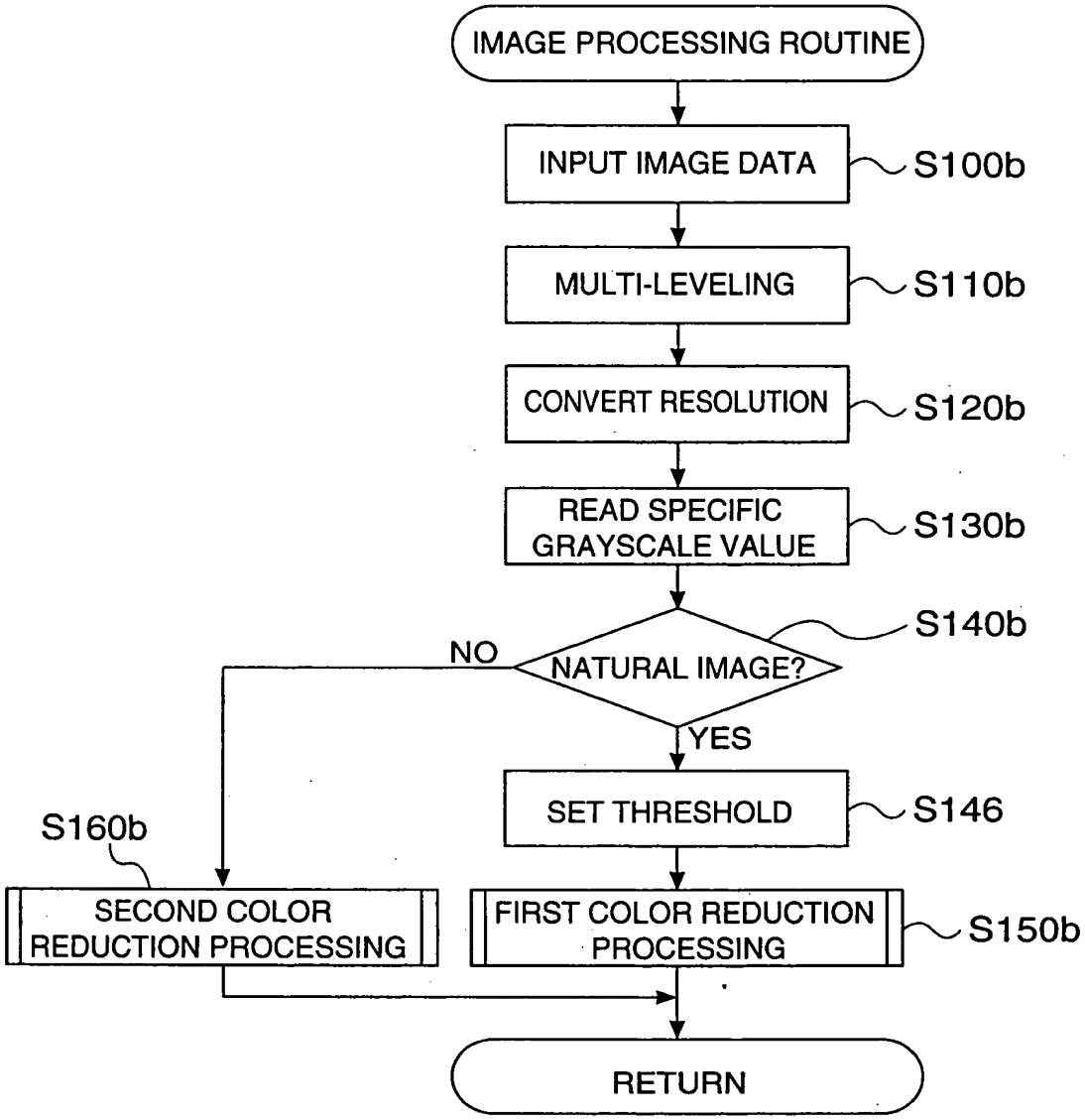


FIG. 13

	(READ)GRAYSCALE VALUE							
	0	1	2	3	4	5	6	7
S310	TH01	TH11	TH1	TH1	TH1	TH1	TH1	TH1
S320	TH2	TH21	TH22	TH2	TH2	TH2	TH2	TH2
S330	TH3	TH3	TH32	TH33	TH3	TH3	TH3	TH3
S340	TH4	TH4	TH4	TH43	TH44	TH4	TH4	TH4
S350	TH5	TH5	TH5	TH5	TH54	TH55	TH5	TH5
S360	TH6	TH6	TH6	TH6	TH6	TH65	TH66	TH67

FIG. 14

20140207.2256560

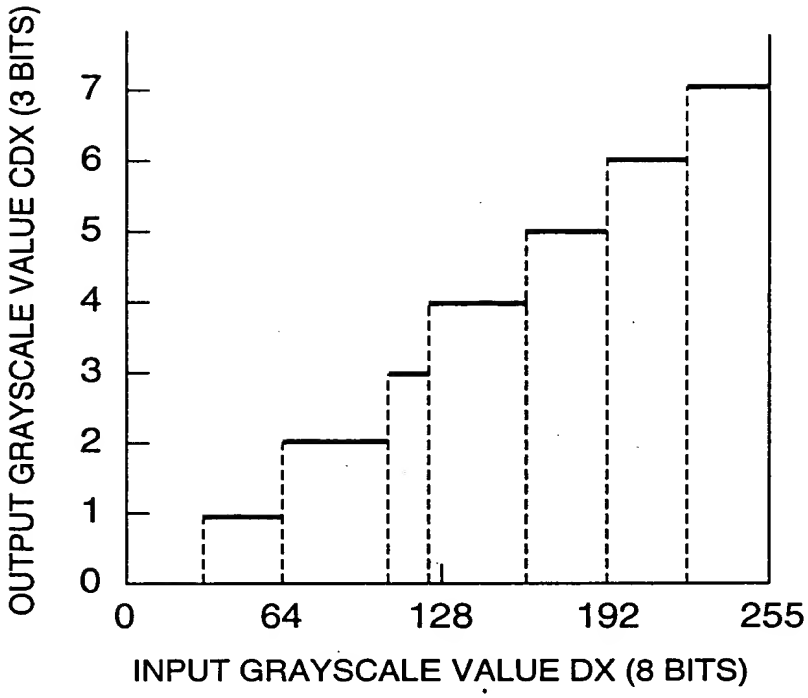


FIG. 15

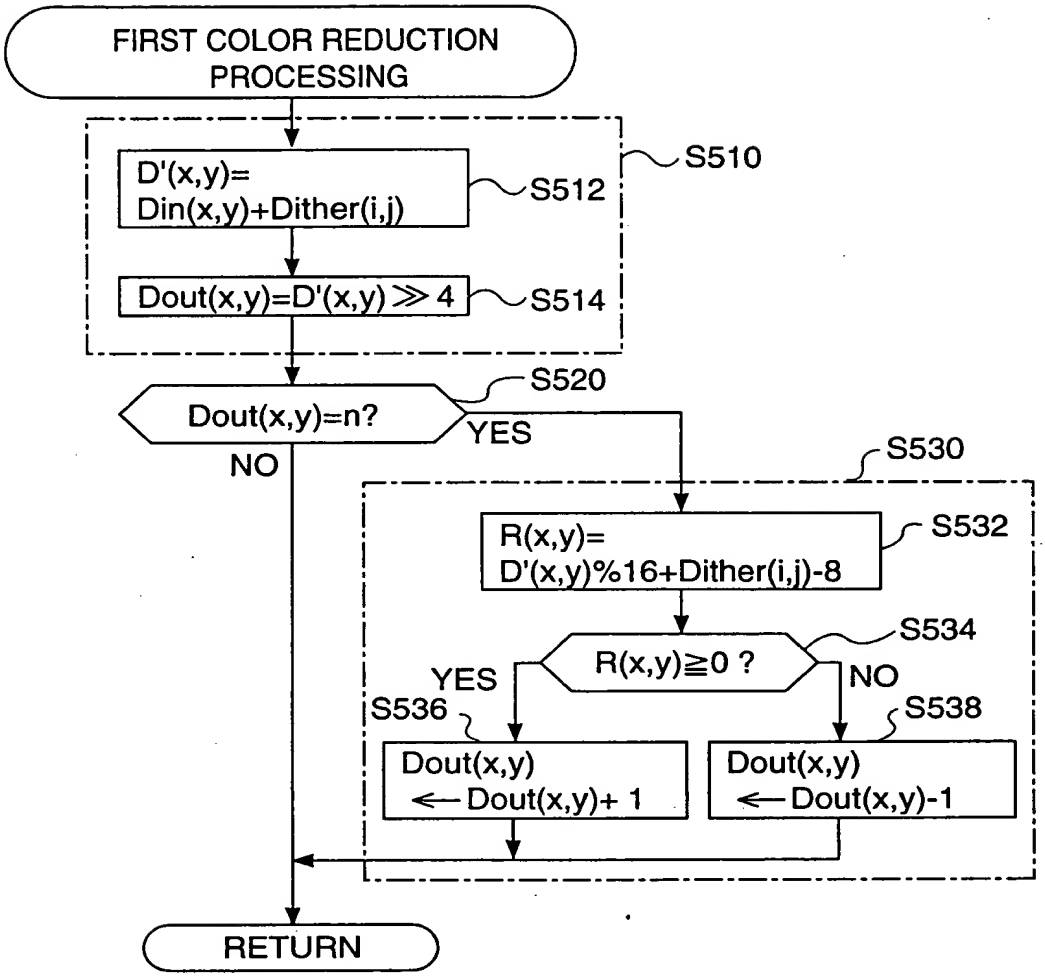

FIRST COLOR REDUCTION PROCESSING
D'(x,y)= Din(x,y)+Dither(i,j)
S512
S510
Dout(x,y)=D'(x,y) ≫ 4
S514
S520
Dout(x,y)=n?
YES
NO
S530
R(x,y)= D'(x,y)%16+Dither(i,j)-8
S532
S534
R(x,y)≧0 ?
YES
NO
S536
S538
Dout(x,y) ← Dout(x,y)+ 1
Dout(x,y) ← Dout(x,y)-1
RETURN

FIG. 16

<DITHER MATRIX:Dither(i,j)>

	0TH COLUMN	FIRST COLUMN	SECOND COLUMN	THIRD COLUMN
0TH LOW	−8	0	−6	+2
FIRST LOW	+4	−4	+6	−2
SECOND LOW	−5	+3	−7	+1
THIRD LOW	+7	−1	+5	−3

(DECIMAL NOTATION)

0956267 .021102

FIG. 17

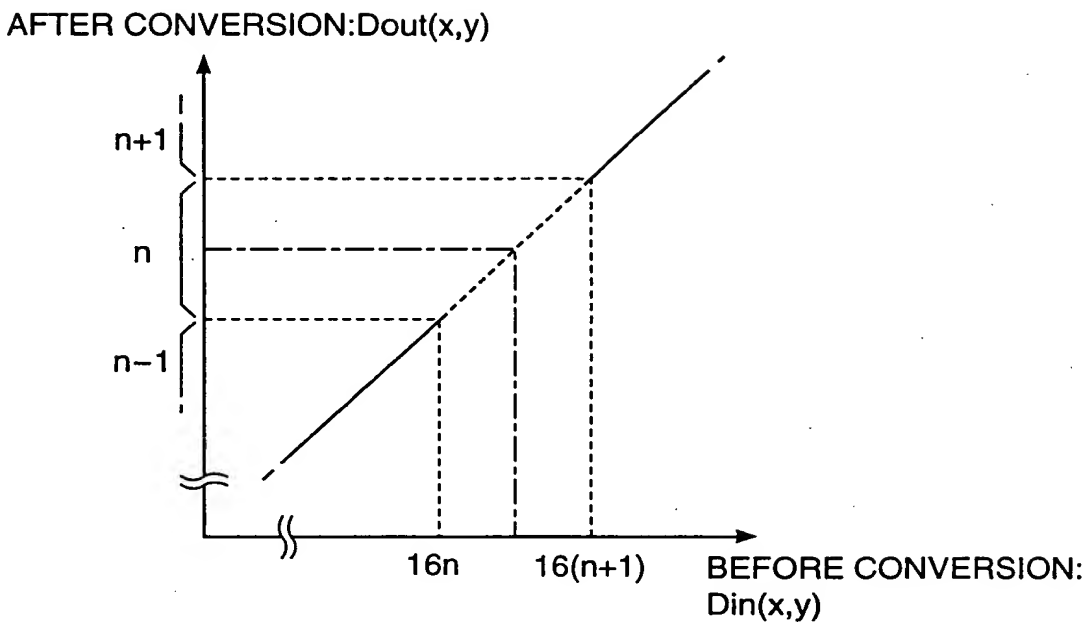


FIG. 18A

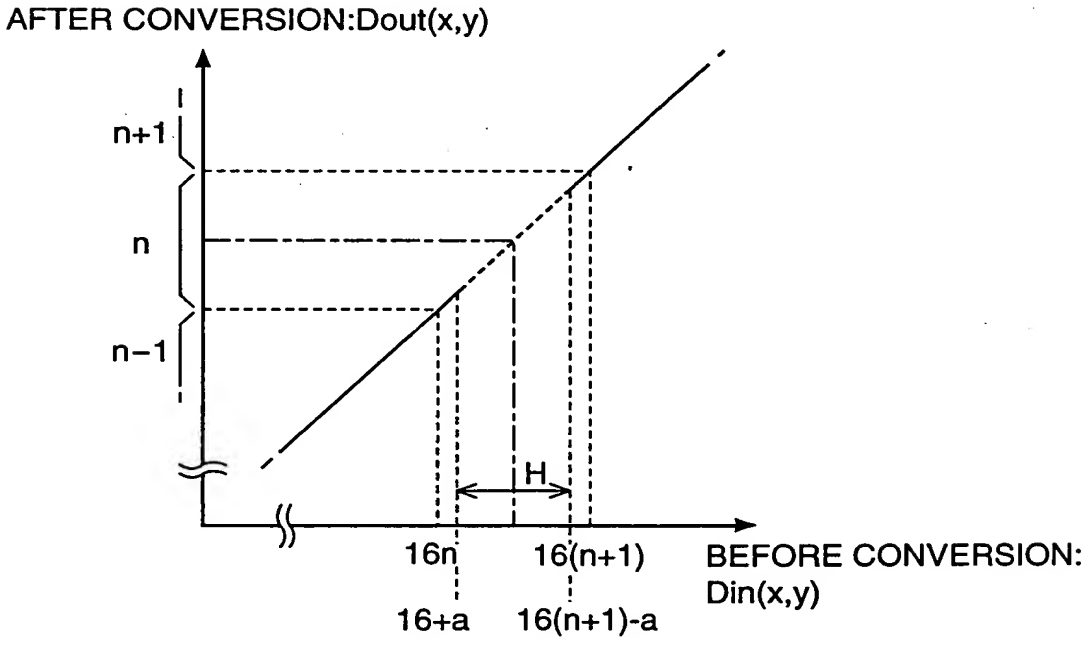


FIG. 18B

20040225

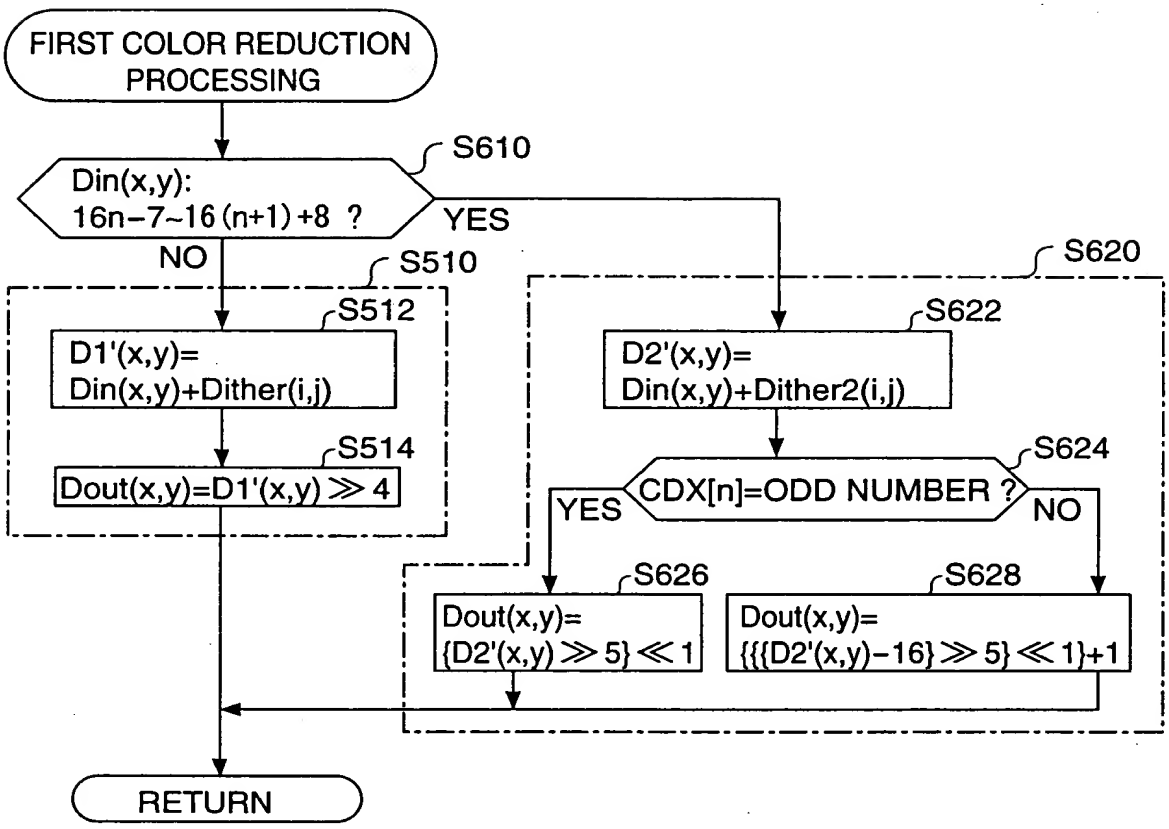


FIG. 19

US 6,606,407 B2

<DITHER MATRIX:Dither2(i,j)>

	0TH COLUMN	FIRST COLUMN	SECOND COLUMN	THIRD COLUMN
0TH LOW	−8	+8	−4	+12
FIRST LOW	+16	0	+20	+4
SECOND LOW	−2	+14	−6	+10
THIRD LOW	+22	+6	+18	−2

(DECIMAL NOTATION)

09956267.021102

FIG. 20

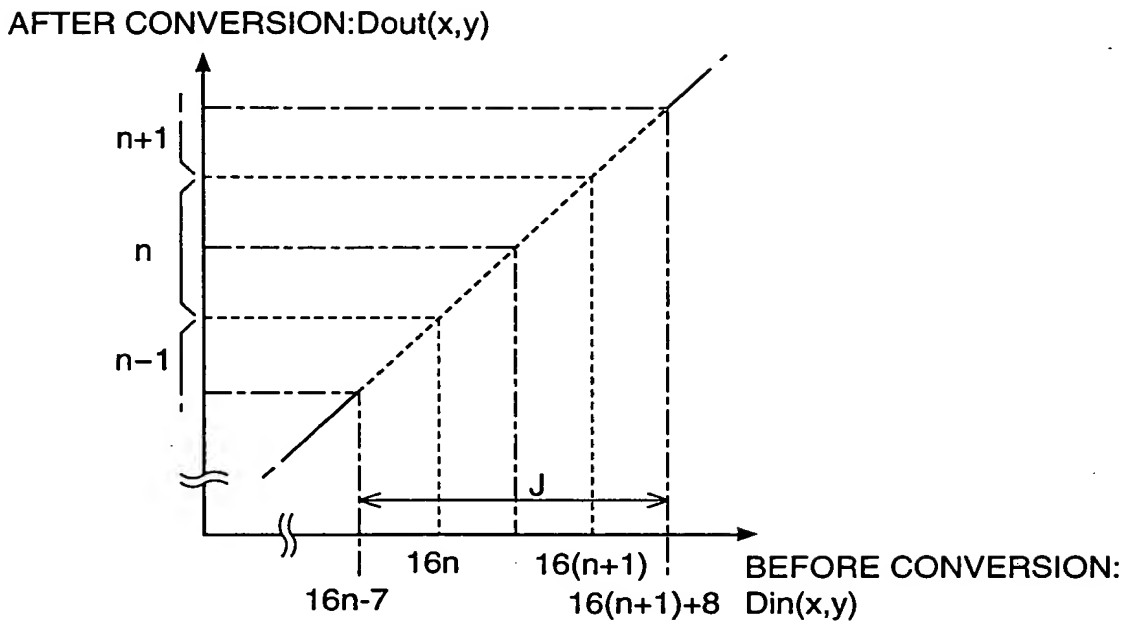


FIG. 21A

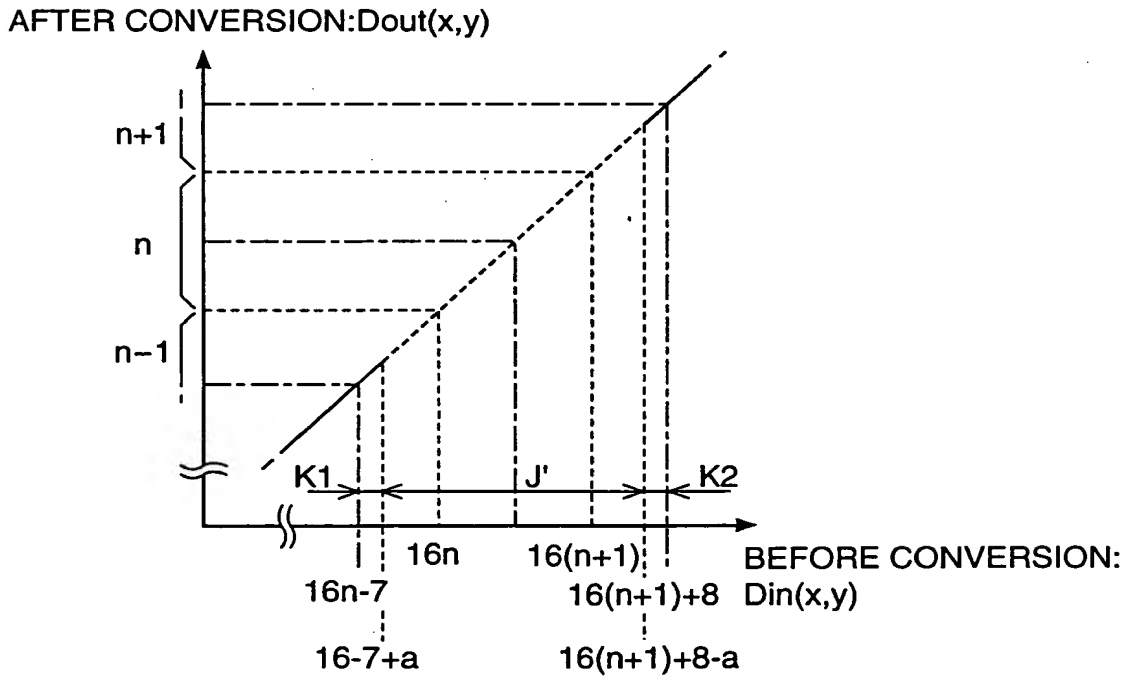


FIG. 21B

0060525 .0210202

0956267.021102

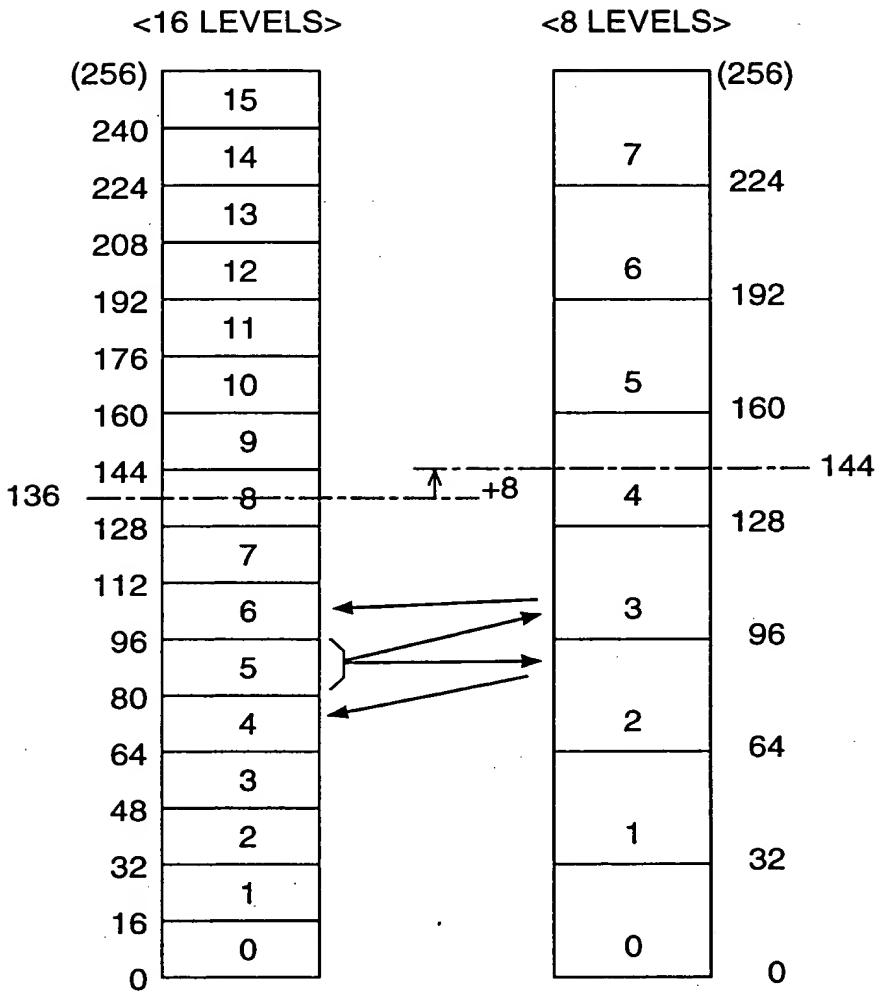


FIG. 22

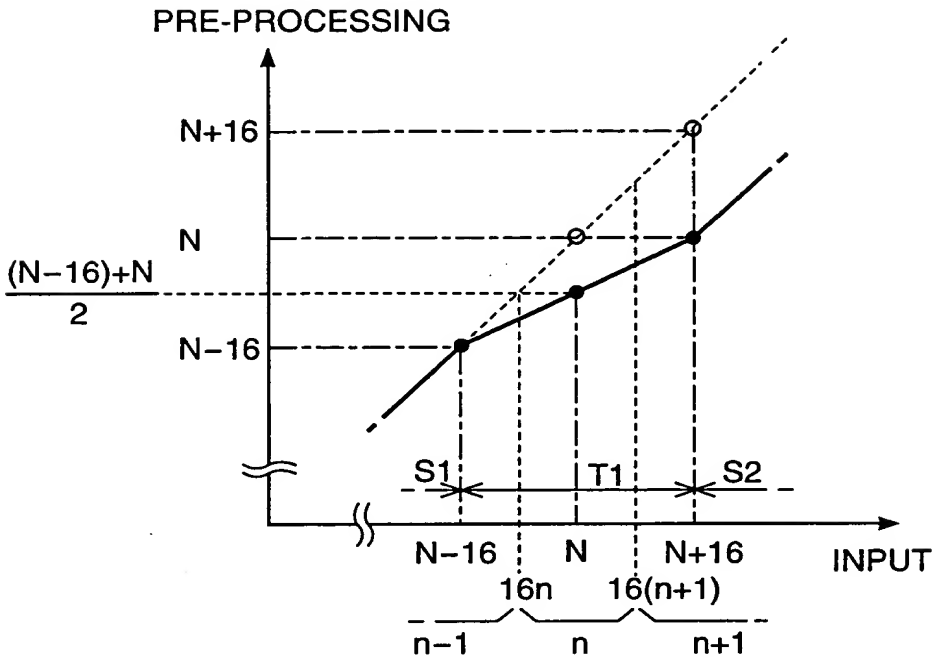


FIG. 23A

INPUT	PRE-PROCESSING	DITHER PROCESSING	POST-PROCESSING
⋮	⋮	⋮	⋮
N−16	N−16	n−1	n−1
⋮	⋮	⋮	⋮
N	$\frac{(N-16)+N}{2}$	n−1,n	n−1,n+1
⋮	⋮	⋮	⋮
N+16	N	n	n+1
⋮	⋮	⋮	⋮

FIG. 23B

0966257.021102

09662267.021402

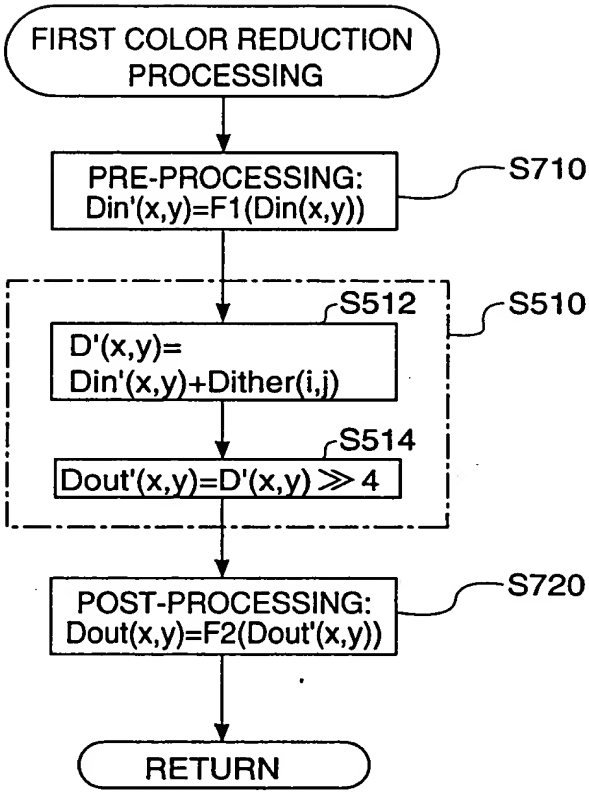
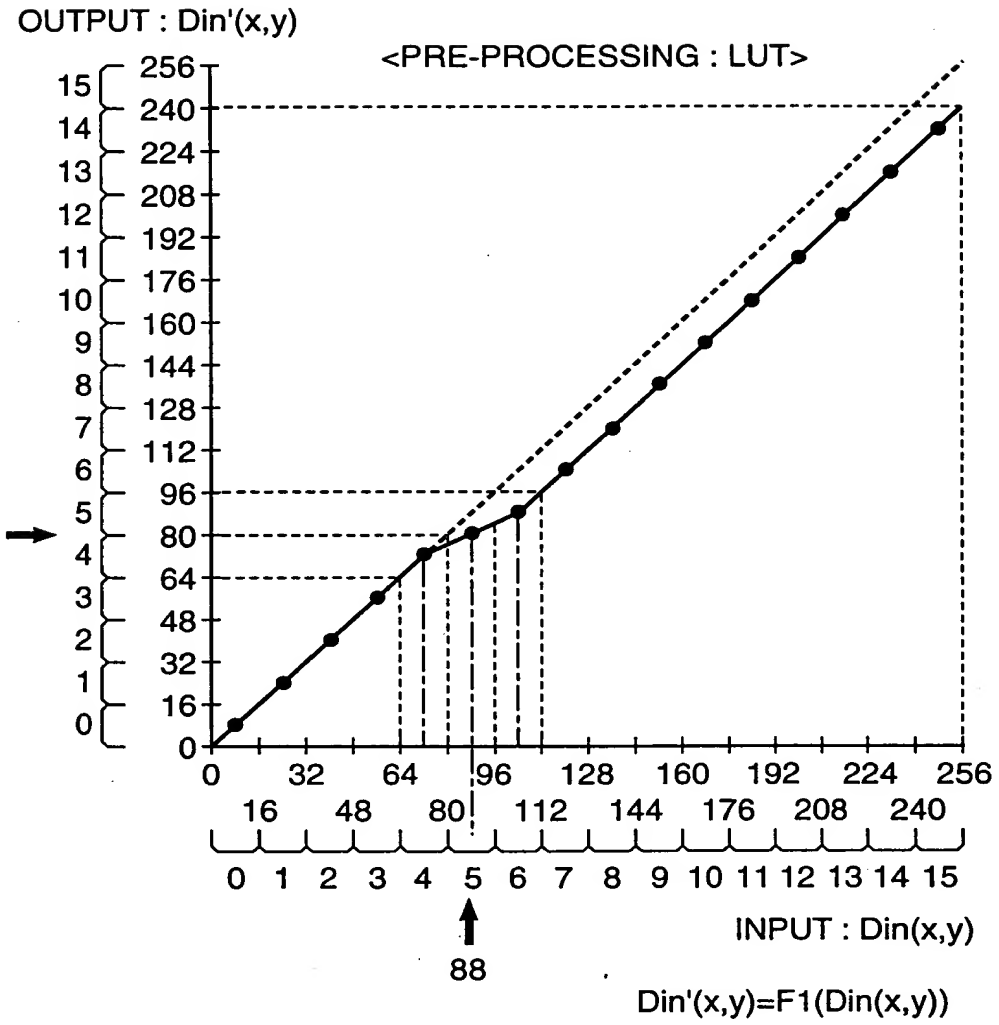


FIG. 24



09656267.021102

FIG. 25

<POST-PROCESSING : LUT>

INPUT : Dout'(x,y)	OUTPUT : Dout(x,y)
0	0
1	1
2	2
3	3
4	4
5	6
6	7
7	8
8	9
9	10
10	11
11	12
12	13
13	14
14	15
(15)	15

0060626.0211102

FIG. 26

0956626.021102

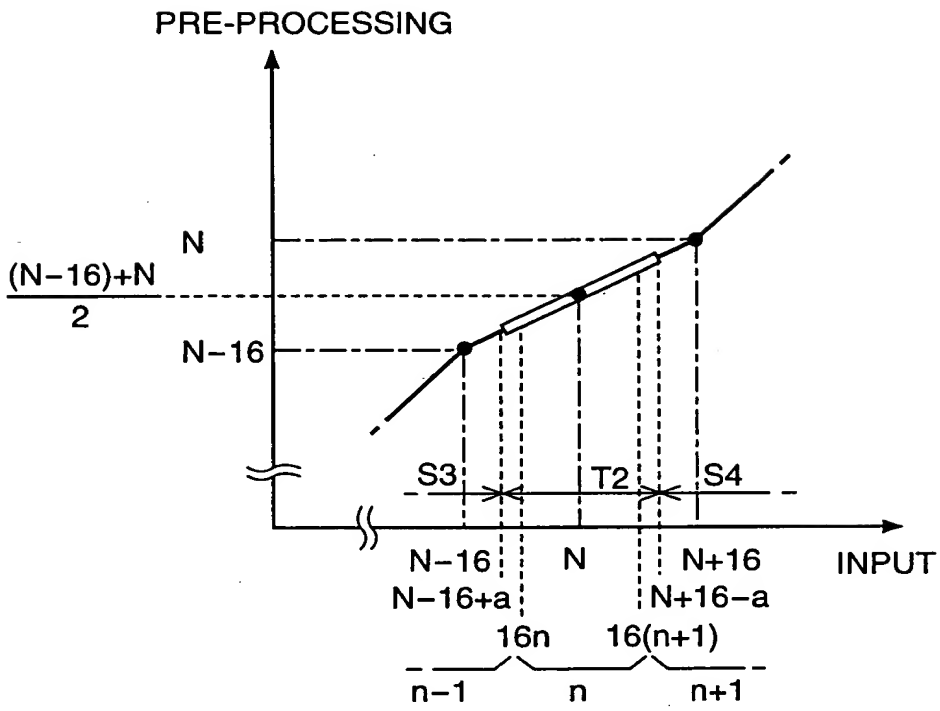


FIG. 27

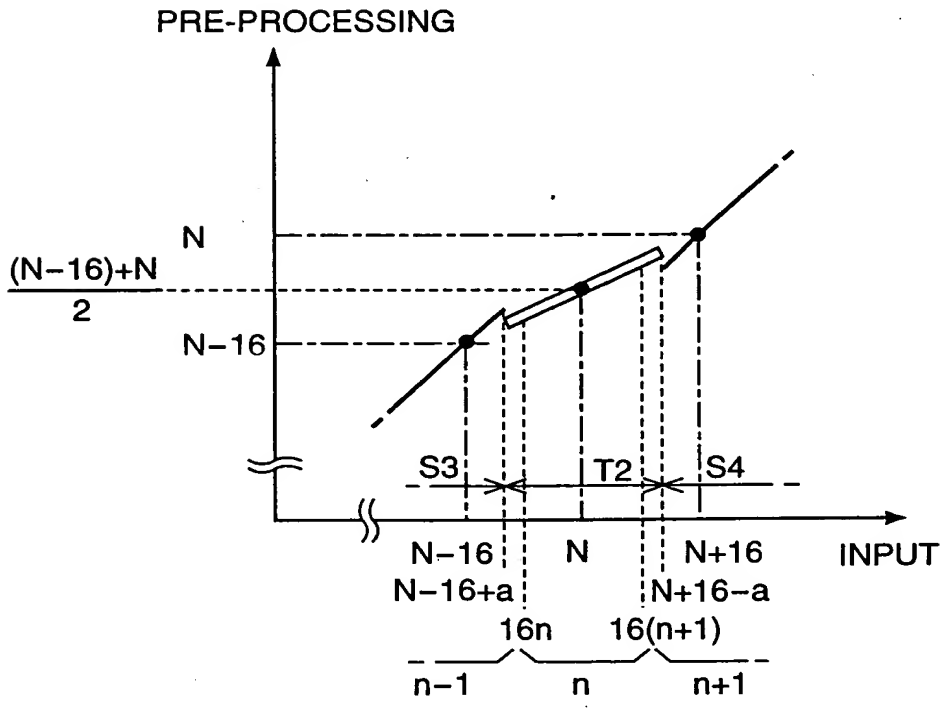


FIG. 28

<POST-PROCESSING : LUT>

INPUT	OUTPUT		
	S3	T2	S4
⋮	⋮	⋮	⋮
n−2	n−2	n−2	n−2
n−1	n−1	n−1	n
n	n	n+1	n+1
n+1	n+2	n+2	n+2
⋮	⋮	⋮	⋮

FIG. 29

20170209527

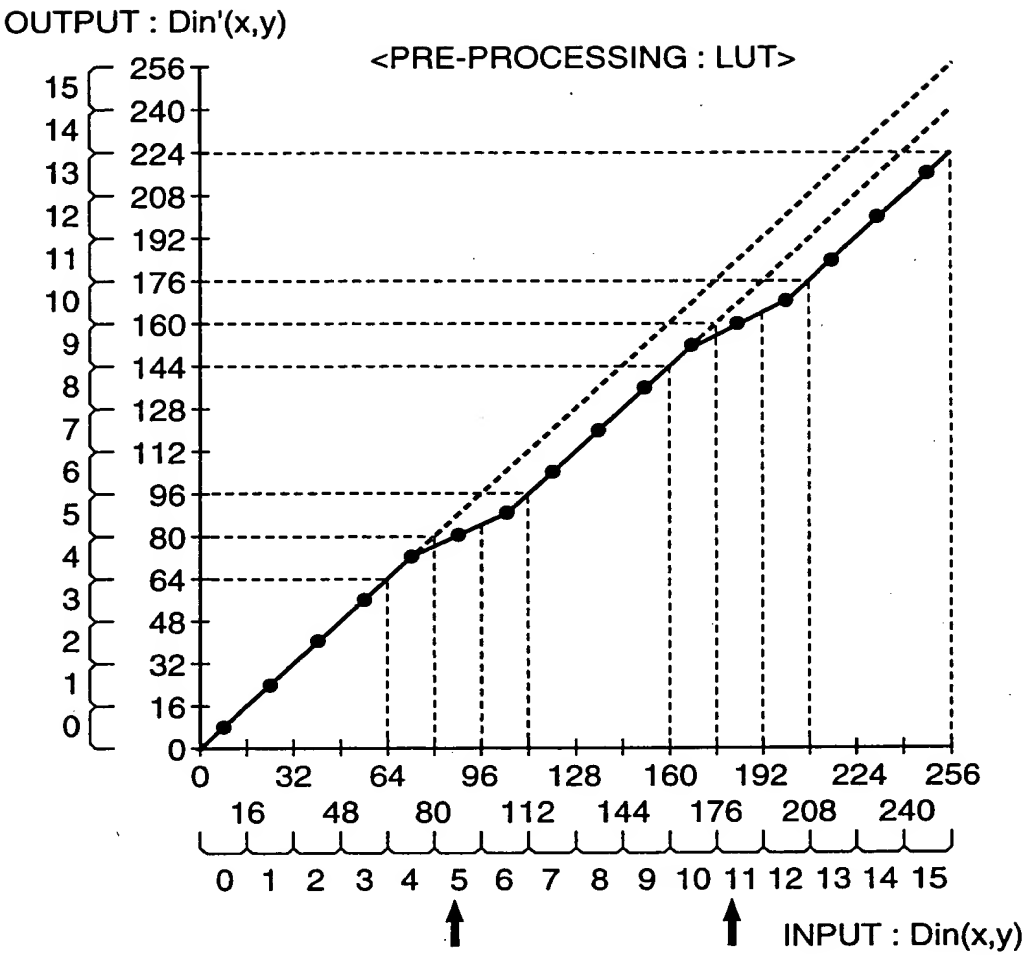

OUTPUT : Din'(x,y)
<PRE-PROCESSING : LUT>
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
256
240
224
208
192
176
160
144
128
112
96
80
64
48
32
16
0
0 32 64 96 128 160 192 224 256
16 48 80 112 144 176 208 240
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
INPUT : Din(x,y)

FIG. 30

<POST-PROCESSING : LUT>

INPUT : Dout'(x,y)	OUTPUT : Dout(x,y)
0	0
1	1
2	2
3	3
4	4
5	6
6	7
7	8
8	9
9	10
10	12
11	13
12	14
13	15
(14)	15
(15)	15

0095225J.021102

FIG. 31